Intent-Driven, Board-Aware Pin Mapping

Defensive Disclosure / Prior Art

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Summary

This document discloses the idea of an intent-driven, board-aware pin mapping system for microcontroller development boards (e.g., STM32 Nucleo, Arduino, ESP32).

Instead of manually selecting peripheral instances and pins, a user specifies functional intent (e.g., “SPI”, “I2C on left side”, “USB + 8 ADC channels”).

The system automatically chooses the best peripheral instance, board-exposed pins, and produces a conflict-free, placement-aware pin map.

Core Idea

The system performs:

1. Peripheral instance selection (e.g., SPI1 vs SPI2)

2. Pin assignment based on board exposure

3. Conflict detection (AF overlaps, analog limits, debug pins, solder bridges)

4. Placement preferences (left/right/any)

5. (Optional) Development board recommendation based on required peripherals

Purpose

This publication serves as timestamped prior art to prevent others from patenting these concepts.

No source code or implementation details are included.

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End of Disclosure